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AUTHOR Hepburn, Eric; And Others
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ABSTRACT

This paper discusses the integration of positivist single-subject design with interpretive, or naturalist, qualitative methods in the development of effective interventions for rural special education students. The resulting research/intervention design includes: (1) extending the normal baseline period from 3 to 10 days thus allowing the researcher to question all relevant peers, adults, and the student him/herself in order to investigate multiple realities, triangulate the data, and ferret out a research design and an initial independent variable; (2) applying the independent variable in the classroom setting while continuing to monitor multiple realities in order to fine-tune the design and discover other independent variables; (3) returning to the baseline phase without the application of the independent variable; and (4) applying a new independent variable based upon information gathered in the first three phases and comparing the effects of the first and second independent variables. The synthesis of positivist and interpretive methods results in the following theoretical assumptions: (1) there are multiple realities; however, the reality of the targeted research participant is of primary concern; (2) the research participant, teacher, and researcher continually interact, calling for an understanding of differences in realities; (3) research seeks to generalize theoretically, not statistically; (4) causality of realities may demonstrate functional relationships; and (5) the values of everyone involved in the research must be defined to control bias. This method allows researchers to connect student behavior with internal states and subsequently attempt to affect internal states through behavior intervention. (LP)

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INTERPRETIVE SINGLE-SUBJECT DESIGN: A RESEARCH TOOL FOR PRACTITIONER-GUIDED APPLIED INQUIRY IN RURAL SETTINGS

Eric Hepburn, PhD
Robert Gerke, MA
S.W. Stile, PhD
New Mexico State University

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Eric Hepburn, Ph.D.
Robert Gerke, M.A.
S.W. Stile, Ph.D.
New Mexico State University

Interpretive Single-Subject Design: A Research Tool For Practioner-Guided Applied Inquiry in Rural Settings

Many teachers sense that they need to do something different about a problem confronting them with a particular child and/or his or her immediate learning environment, but they are stymied, often not knowing what to do or how to do it. Freiberg (1992) asserts that many teachers wish to bring their teaching not only closer to recommended practice standards but also, by implication, many teachers wish to take it a step or two further for the exceptional child or situation; but again they don't know how. They have a desire to grow, but they need help. While Zins, Curtis, Graden, and Ponti (1988) have verified that the delivery of effective educational services to children with handicaps and at-risk students has been the subject of much current concern in rural and urban settings, rural schools and respective issues, teacher development, and exceptional students' needs appear to be in double jeopardy. Rural schools have not only received less attention, but rural exceptional students are at higher risk than their urban peers (DeYoung, 1987; Helge, 1985, 1990).

Rationale

As credit to an already exemplary tradition of having to fend for one's self due to a paucity of resources and a seemingly skewed legislative rural focus (Helge, 1985; Illback & Ellis, 1981), rural communities and schools have historically been experimenting with creative programming for handicapped and nonhandicapped students (Huebner & Wise, 1992). Nowhere in the field of educational service delivery is creativity more critical and more rewarding than in direct instruction-intervention with students. What looms equally critical for teachers then is to continue to build and capitalize on existent collaborative intra-community, intra-school, and student resource pools, engendering creative resolve and cost-effective problem solving consistent with rural tradition and context.

Huebner and Wise (1992) suggest that such resource strategies not only increase intraschool resources but also capitalize on the unique assets of the rural community (p.21). Hepburn and Stile (in press) suggest a variation on an inquiry (applied research) theme that would simultaneously provide the concerned and inquisitive teacher with a framework that helps formulate not only what to do but answers the "so what now" how-to-do-it question. Because of its inclusion of the naturalistic-qualitative data base used to precisely tune intervention, this diagnostic and prescriptive teaching tool utilizes those uniquely local qualitative features gleaned from in vivo experiences that characterize an individual, as well as a group of students in rural settings.

Toward an Interpretive Singe-Subject Design: From Thin Description to Thick Interpretation[1]

Ever since the publication of Thomas Kuhn's, The Structure of Scientific Revolutions in 1962, there has been a gradual shifting in the basic premises of gathering and validating scientific knowledge. With this shift has come an increasing

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awareness of the importance of understanding the social and historical contexts of individual and group behaviors. In order to better understand these contexts, authors such as Ballard (1986) have called for a more concerted effort to utilize qualitative methods in data gathering for behavioral research.

Single-Subject Positivism vs. Interpretive Thought

As described by Borg and Gall (1989), the distinguishing feature of single-subject design is that the sample of subjects is one (i.e., N=1). If two or more subjects are treated as one group, single-subject methods are still applicable. A second distinguishing feature is continuous measurement over time as opposed to pre- and posttesting. A third major difference between single-subject and other quantitative designs is the heavy reliance upon graphic significance rather than statistical significance. For example, in a study of the effects of immediate feedback and primary reinforcement (the independent variables) on time-on-task (the dependent variable), data were collected on the behavior of a single subject over 21 sessions divided into four phases. The four phases alternated observation of the subject without application of the independent variables (the baseline, or A1 and A2 phases) with the experimental (or B1 and B2) phases where the independent variables were applied.

Although the three distinguishing features of N=1 inquiry set it apart from traditional group quantitative designs, the underlying belief system of single-subject and group quantitative designs devotees is "conventional" or "positivist" as described by Guba nd Lincoln (1989) and Lincoln and Guba (1985). Given contrasting belief systems or "paradigms" (Table 1), is it possible that single-subject "conventionalists" and "constructivists" (not necessarily single-subject constructivists) can accommodate one another in the conduct of inquiry in special education settings? As Guba and Lincoln (1989) have speculated, accommodation:

> will come about, if ever, because adherents of both paradigms will agree to engage in..... discussion that will result in a new construction with which all can agree, not because the new construction is "truer" than other of its predecessors but because it is better informed and more sophisticated. (p. 115)

Nature of reality (ontology). The first set of assumptions concerns ontology, or the nature of reality. According to positivist thought, there is one concrete reality that is shared by all people. Conversely, interpretive thought holds that realities are socially constructed and that sharedness of realities within a group is the result of social processes (e.g., Berger & Luckmann, 1967; Denzin, 1989; Douglas & Jounson, 1977; Heidegger, 1962; Husserl, 1960, 1968; Mearleau-Ponty 1962; Sartre, 1956; Schutz, 1962, 1976).

Knower-known relationships (epistemology). Epistemology is concerned with the nature of knowing and knowledge. Whereas positivism views the separation of the observer and reality as an ideal, the interpretive position maintains that all knowledge is necessarily filtered through human perception, so no separation is possible.

Table 1

Contrasting Positivist and Naturalist Axioms

Axioms About	Positivist Paradigm	Naturalist Paradigm
The nature of reality	Reality is single, tangible and fragmentable.	Realities are multiple, constructed, and holistic.
The relationship of knower to the known	Knower and known are independent, a dualism.	Knower and known are interactive, inseparable
The possibility of generalization working	Time- and context-free generalizations (nomothetic statements) are possible.	Only time- and context-bound hypotheses (idiographic statements) are possible.
The possibility of causal linkages	There are real causes, temporally precedent to or simultaneous with their effects.	All entities are in a state of mutual simultaneous shaping, so that it is impossible to distinguish causes from effects.
The role of values	Inquiry is value-free.	Inquiry is value-bound.

Note. From Naturalistic Inquiry (p. 37) by Y. S. Lincoln and E. G. Guba, 1985, Beverly Hills: Sage. Copyright 1985 by Sage Publications, Inc.

Generalization. Positivism seeks objective truths that are valid across space and time. That is, they are generalized to other situations and contexts. The interpretive view is that truths are bound to the contexts and situations where they occur, so that generalization across space and time is always problematic.

Causality. One of the basic goals of positivistic science is to be able to generalize across time and space in order to achieve a reliable level of control and prediction. This goal relies on a linear notion of causality that cannot account for the complexity of human interaction. As such, the interpretive response focuses on seeking more understanding of the ways causes and effects interact in situational contexts.

Role of values (axiology). Axiology has to do with the role of values in inquiry, since positivism seeks objective generalized truths, it takes great care in developing research methodologies that are free of investigator values. According to the interpretive assumptions, however, a value-free research methodology would be impossible because the researcher must make value decisions at every level of inquiry, beginning with the choice of a research problem.

Purpose

This essay's purpose is to consider the integration of single-subject designs founded on positivist assumptions with qualitative methods drawing on interpretive, or naturalist, axioms. The resulting integration should provide a single-subject design with increased depth of knowledge and effective understanding for rural settings.

Designs

Suppose a student appears preoccupied with violent thoughts. Further suppose that his teachers are dismayed because (a) the student is modeling violent manifestations of his thoughts to other students, (b) the classroom climate is becoming negative, (c) parents of other students are beginning to express concern, and (d) critical curricular elements are being ignored in an attempt to control the student's overt behavior(s). What designs would be appropriate to study effectiveness of programs designed to modify/manage this student's behavior?

ABAB Design

One approach would be to address the situation by:

1. Identifying an independent variable (e.g., x);
2. Observing the student without applying x;
3. Applying x;
4. Withdrawing x; and then
5. Reapplying x with little or no contact between the student and data collector.

ABAC Design

Another approach would be to combine N=1 quantitative and qualitative methods. Such a combined approach could consist of the following steps or phases:

1. Baseline 1 (A). Extend the normal baseline period by at least seven days (e.g., minimum of 10 instead of three days) to accommodate the inquirer who actively questions all relevant peers, adults, and the student himself in the classroom and at home in order to (a) investigate multiple realities, (b) triangulate the data, and (c) ferret out a research design and initial independent variable (x);

2. First intervention (B). The inquirer applies x in the classroom setting. He/she continues to monitor multiple realities in order to (a) fine-tune the design and (b) discover other independent variables (y, z,,....., etc.). Formative evaluation of effects of x upon the student's undesirable behavior would also be carried out during this phase;

3. Return to baseline (A). This is a short period in which the activities in the B phase are extended by the inquirer without application of x; and,

4. Second intervention (C). Based upon information gathered by the inquirer in the first three phases, a new independent variable (y) has been shaped. The second intervention is used to compare effects of x and y; not to examine the effects of x for a second time as indicated an ABAB design. Figure 1 illustrates results of this positivist-naturalist intervention over time using mock data.

Discussion

The addition of interpretive thought and qualitative data allows the researcher to develop a more sophisticated, in-depth understanding of the research participant and the context situation. Instead of just reporting surface behaviors, referred to by some authors as "thin descriptions" (Denzin, 1989; Geertz, 1973; Ryle, 1971), the researcher now accesses the meanings of the respondent's multiple realities, and may engage in "thick interpretation" (Denzin, 1989). That is to say, the researcher may fine tune interventions by developing a more comprehensive understanding of the participant's behaviors and the meanings connected to those behaviors.

The blending of N=1 quantitative and qualitative methods seems attractive because both are (a) context situational, (b) applicable with small numbers of subjects, (c) empirical (deal with what is seen and heard), and (d) are non-traditional. As to reconciling the positivist assumptions inherent in single-subject design with the interpretive axioms supporting qualitative methods, the following synthesis of paradigms is suggested.

1. Reality (ontology): There are multiple realities, however the reality of the targeted research participant is of primary concern.
2. Knower-known relationship (epistemology): The research participant, teacher, and researcher (if different from teacher) are intertwined in interaction, calling for an understanding of differences in operating realities.
3. Generalization: Research seeks to generalize theoretically (Yin, 1989), not statistically.
4. Causality: With the added awareness of multiple realities,

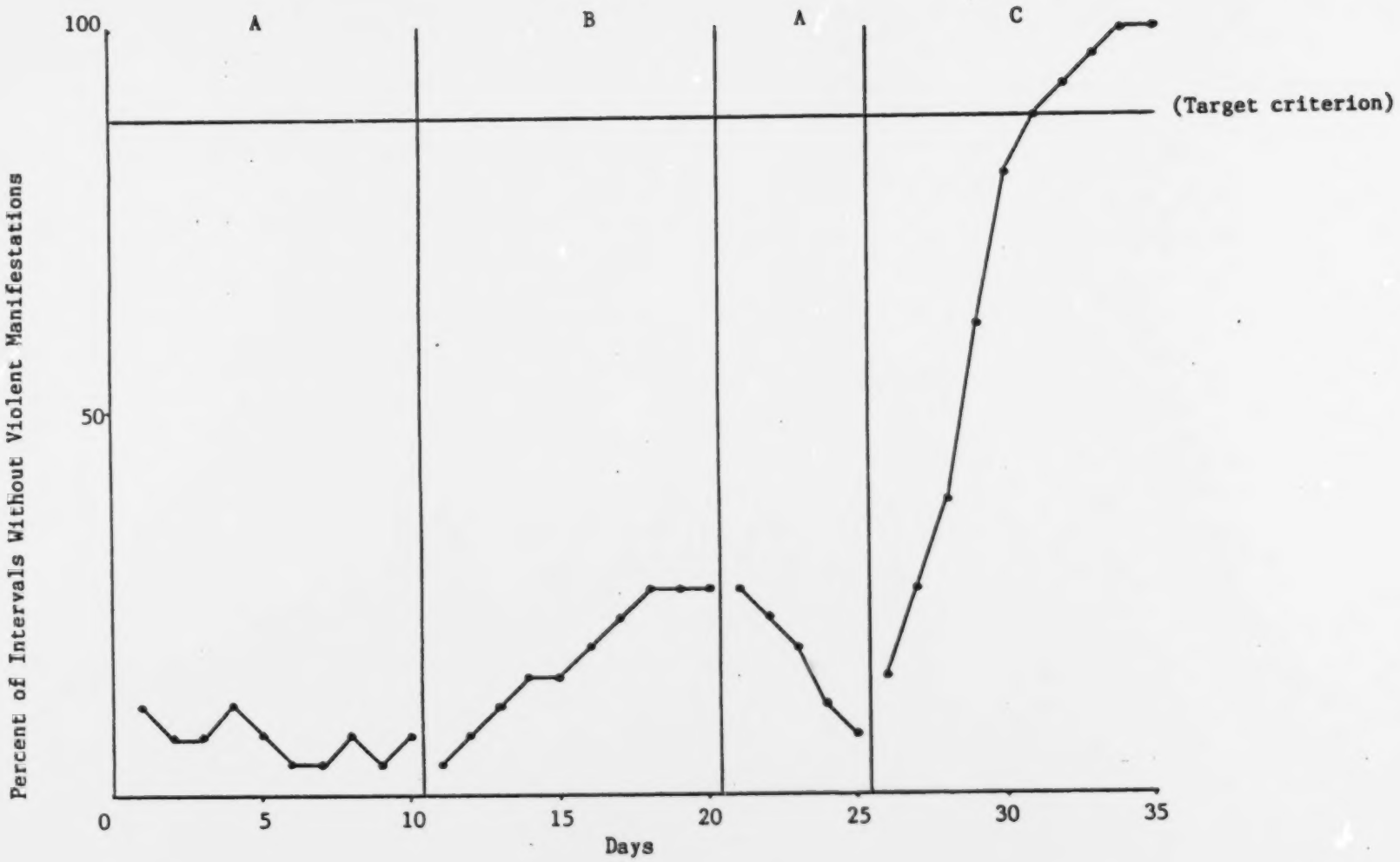

Figure 1. Percentage of intervals in which violent manifestations occured. (Mock Data)

causality should be approached as mutual simultaneous shaping, which may still demonstrate functional relationships.

5. Values (axiology): The values of everyone involved in the research are delineated in the above discussion of the multiple realities in interaction. This allows for the control of bias.

This integration of paradigms, as a suggested starting point, opens up single-subject research to the use of qualitative methods and the investigation of interpretive theoretical insights as to the meanings involved in student behaviors. This integration was attempted in a study by Hepburn and Repps (1991), in which it was determined that a 15 year old student labeled behaviorally disordered did not voluntarily present himself for involvement in academic group interaction. In not presenting himself, the teacher was limited in the amount of academic and social success that could be reinforced, in order to enhance the student's self-concept. After conducting a qualitative case study, the researchers designed an intervention that situationally induced the student to participate in academic interaction, with virtually no risk of failure. At that point the student experienced success, which was subsequently reinforced verbally with referential status from the classroom teacher. The results indicated that the student's rate of voluntary presentation increased dramatically and maintained at an above average level (see Figure 2).

This study combined qualitative methods with interpretive theoretical insight into the reality that the student experienced in the classroom. This insight allowed the researchers to connect external, observable behavior with internal states, and, subsequently, attempt to affect those internal states through a behavioral intervention.

Limitations

The major issue regarding merging of the two paradigms is temporal in nature. Specifically, the additional demands of qualitative research significantly expand single-subject design baseline and treatment phases--this would hold true across all families of N=1 designs including the ABA family which was used here as a base for discussion. However, it may be that the additional time required to arrive at qualitative understandings, such as mutual simultaneous shaping and triangulation, will result in a deeper understanding of *why* a behavior occurs. This information is usually not obtained as a result of single-subject inquiry with its traditional emphasis upon knower-known dualism.

Model Application

In point of fact, there are as many applications of this model as there are people being confronted with problem-solving situations of some sort. While this appears to be an oversimplication of the model's utility, a more avid in-depth understanding of its combined axiological basis, procedural format, and intra/interpersonal scrutiny of problem-solving routines would provide a more observable, reliable, and valid affirmation of its functional utility. Although this model may not be readily recognizable to some as one's household words, its procedural basis occupies every nook and cranie of life's contexts and has undoubtably been the silent partner on a daily basis in both instantaneous and long term problem-solving scenarios.

Recall that simple phone call to chat with a close friend that turned into a cold war for no apparent reason across several follow-up phone calls. On one end, the party is wondering what they have done

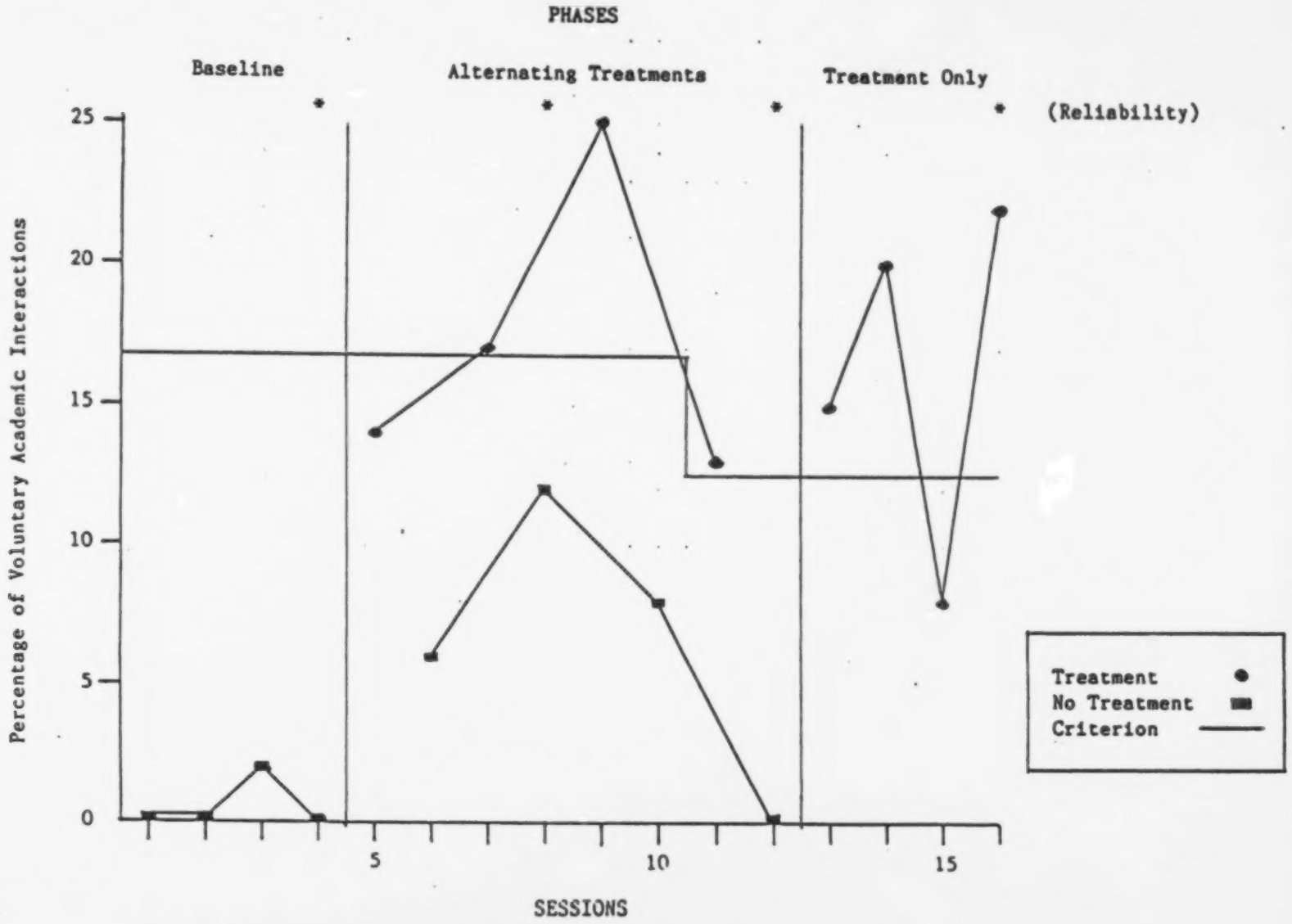

Figure 2. Results of induced self-presentation and situational referencing on the percentage of voluntary responses during 50 minute class periods.

to warrant this sudden withdrawal, while on the other end the party is feeling put upon or some other thought, the point being both parties immediately developing a theory for self preservation and alleged understanding. The questions that arise are (a) what am I going to do about it, and (b) how am I going to do it. Sound familiar? Usually what follows in varying timelines is some sort of initial response (no response is a response) that is contingent on our perception of problem severity, relational maintenance issues, and/or the need for additional information from as many discrete sources, in this case, as seems appropriate to achieve our specified goal.

Consequently, in light of new information we plan and take different action than perhaps we initially employed. One party either changed their behavior dramatically, the problem was not really a relational problem but displaced to the relation (causality), compromise, or forgiveness, and so on. What has worked in the past may not necessarily work in the future. This becomes critically important when working with children. Teachers and parents need to reconsider not only their interconnectedness within the learning contexts defined by multiple relationships with children, but also the uniqueness of how individual children assimilate developmental milestones themselves.

As was the case with the student not presenting himself for social affirmation, the teacher-inquirer sought clarification relevant to the social dynamics of the student's presenting problem. In general, this approach significantly reduces the cure becoming worse than the presenting problem, enhances a more cost-benefit use of teacher and student time, personalizes the intervention, and is existentially recursive.

Notes

[1]Portions of this essay have appeared in

Hepburn, E., & Stile, S.W. (in press). Toward an interpretive single-subject design: From thin description to thick interpretation. In S.W. Stile, N=1 for inquiry. Dubuque, IA: Kendall/Hunt.

References

Ballard, K.D. (1986). Group designs, within-subject designs, case-study designs, and qualitative methodologies in educational and psychological research. New Zealand Journal of Education Studies, 21(1), 42-54.

Berger, P.L., & Luckmann, T. (1967). The social construction of reality. Garden City, NY: Doubleday.

Borg, W.R., & Gall, M.D. (1989). Educational research: An introduction (5th Ed.). New York: Longman.

Denzin, N.K. (1989). Interpretive interactionism. Beverly Hills: Sage.

DeYoung, A.J. (1987). The status of American rural education research: An integrated review and commentary. Review of Educational Research, 57, 123-148.

Douglas, J.D., & Johnson, J.M. (Eds.) (1977). Existential sociology. Cambridge: Cambridge University Press.

Freiberg, K.L. (Ed.) (1992). Educating exceptional children (6th edition). Sluice Dock, CN: Duskin Publishing.

Geertz, C. (1973). The interpretation of cultures. New York: Basic Books.

Guba, E.G., & Lincoln, Y.S. (1989). Fourth generation evaluation. Beverly Hills: Sage.

Heidegger, M. (1962). Being and time. New York: Harper and Row.

Helge, D. (1985). The school psychologist in the rural education context. School Psychology Review, 14, 402-420.

Helge, D. (1990). National study of at-risk students. Communique, 19(2), 10.

Hepburn, J.E., & Repps, R.E. (1991). Voluntary academic interaction as an indicator of self-concept. Unpublished manuscript. Las Cruces, NM: New Mexico State University.

Hepburn, E., & Stile, S. (in press). Toward an interpretative single-subject design: From thin description to thick interpretation. In S.W. Stile, N=1 for inquiry. Dubuque, IA: Kendall/Hunt.

Huebner, E.S., & Wise, P.S.(1992). Training preservice school psychologists to facilitate the implementation of the regular education initative in rural schools. Rural Special Education Quarterly, 11(3), 20-29.

Husserl, E. (1960). Cartesian meditations. The Hague: Nijhoff.

Husserl, E. (1968). The idea of phenomenology. The Hague: Nijhoff.

Illback, R., & Ellis, J.L. (1981). Evaluation of special education in rural settings. Paper presented at the American Psychological Association, Los Angeles, CA.

Lincoln, Y.S., & Guba, E.G. (1985). Naturalistic inquiry. Beverly Hills: Sage.

Merleau-Ponty, M. (1962). The phenomenology of perception (C. Smith, trans.) London: Routledge and Kegan Paul.

Ryle, G. (1971). Collected papers. New York: Barnes & Noble.

Sartre, J.P. (1956). Being and nothingness (H.E. Barnes, trans.). New York: Philosophical Library.

Schutz, A. (1962). Collected papers,, vol. 1: The problem of social reality. The Hague: Nijhoff.

Schutz, A. (1976). Subjective action and objective interpretation. In M. Korenbaum (Ed.), The annals of phenomenological sociology. Dayton, OH: Wright State University Press.

Yin, R. (1989). Case study research. Newbury Park, CA: Sage.

Zins, J., Curtis, M.J., Graden, M.J., & Ponti, C.R. (1988). Helping students succeed in the regular classroom. San Francisco, CA: Jossey-Bass.